CLAIMS:

I claim:

1. An anti-islanding apparatus for isolating a power source from a failed electrical grid, comprising:

a power converter connectable between said power source and said grid;

a means for measuring a voltage of said grid;

a means for calculating a voltage trend in said grid voltage, using a present grid voltage measurement and a prior grid voltage measurement;

a means for calculating a positive feedback power converter control signal based on said voltage trend;

a control circuit connected to said power converter, wherein said control circuit applies said control signal to said power converter; and

a means of disconnecting said power source from said grid when said present grid voltage is outside pre-defined limits.

2. An anti-islanding apparatus according to claim 1, wherein said control signal comprises an acceleration function.

3. An anti-islanding apparatus according to claim 1, further comprising a means for measuring a frequency of said grid;

a means for calculating a frequency trend in said grid frequency using a present grid frequency measurements and a prior grid frequency measurement;

a means for calculating said positive feedback power converter control signal based on said frequency trend; and

a means of disconnecting said power source from said grid when said present grid frequency is outside pre-defined limits.

4. An anti-islanding apparatus according to claim 3, wherein said control signal comprises an acceleration function.

5.   An anti-islanding apparatus according to claim 1, wherein when said power source is operating in a power limited condition, said control signal commands a lower power output in all cases.

6.   An anti-islanding apparatus according to claim 1, wherein said means for measuring operates continuously.

7.   An anti-islanding apparatus according to claim 1, wherein said means for measuring operates at intermittent intervals.

8.   An anti-islanding apparatus for isolating a power source from a failed electrical grid, comprising:

a power converter connectable between said power source and said grid;

a means for measuring a frequency of said grid;

a means for calculating a frequency trend in said grid frequency using a present grid frequency measurements and a prior grid frequency measurement;

a means for calculating a positive feedback power converter control signal based on said frequency trend;

a control circuit connected to said power converter, wherein said control circuit applies said control signal to said power converter; and

a means of disconnecting said apparatus from said grid when said present grid frequency is outside pre-defined limits.

9.   An anti-islanding apparatus according to claim 8, wherein a grid phase is calculated from said grid frequency.

10.   An anti-islanding apparatus according to claim 8, wherein said means of measuring operates continuously.

11.   An anti-islanding apparatus according to claim 8, wherein said means of measuring operates at intermittent intervals.

12.   A method of preventing islanding of a power source on a distributed grid
5   comprising the steps:
        measuring grid voltage;
        calculating a voltage trend in said grid voltage, using a present grid voltage measurement and a prior grid voltage measurement;
        calculating a power converter control signal in a same direction as said voltage
10   trend;
        applying said power converter control signal to said power converter; and
        disconnecting said power source when said present grid voltage measurement is outside acceptable limits.

15   13.   An anti-islanding apparatus according to claim 12, further comprising:
        measuring grid frequency;
        calculating a frequency trend in said grid frequency, using a present grid frequency measurement and a prior grid frequency measurement;
        calculating a power converter control signal in a same direction as said frequency
20   trend;
        applying said control signal to said power converter; and
        disconnecting said power source when said present grid frequency measurement is outside acceptable limits.

25   14.   A method of preventing islanding of a power source on a distributed grid according to claim 12, wherein said calculation of power converter control signal uses an accelerating function.

15.   A method of preventing islanding of a power source on a distributed grid
30   according to claim 12, further comprising;

measuring grid phase;

calculating a phase trend in said grid phase, using a present grid phase

measurement and a prior grid phase measurement;

calculating a power converter control signal in a same direction as said phase

5   trend;

applying said control signal to said power converter; and

disconnecting said power source when said present grid frequency measurement is

outside acceptable limits.

10   16.   A method of preventing islanding of a power source on a distributed grid

according to claim 12, wherein said steps of measuring, calculating, processing,

calculating and applying are performed continuously.

17.   A method of preventing islanding of a power source on a distributed grid

15   according to claim 12, wherein said steps of measuring, calculating, processing,

calculating and applying are performed at intermittent intervals.

18.   A method of preventing islanding of a power source on a distributed grid

according to claim 14, wherein said acceleration function is comprised of linear,

20   exponential, and geometric functions.

19.   A method of preventing islanding of a power source on a distributed grid

according to claim 12, wherein said power converter control signal lowers voltage

in a power limited source.

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20.   A method of preventing islanding of a power source on a distributed grid

comprising the steps:

measuring grid frequency;

calculating a frequency trend in said grid frequency, using a present grid frequency

30   measurement and a prior grid frequency measurement;

calculating a power converter control signal in a same direction as said frequency

trend;

applying said control signal to said power converter; and

disconnecting said power source when said present grid frequency measurement is

5   outside acceptable limits.

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